to entry severely restricts the ability of regulators to ignore economic cost in setting rates.

2. Forward-Looking Costs

Forward-looking costs are the costs of producing a service using the best available technology and practice. Thus, for example, switches may be more efficient today than they were previously (perhaps because they require less maintenance). The forward-looking cost of switching reflects use of the newer technology. In a competitive market, prices are determined by the cost of efficient potential entrants, not the embedded costs of existing firms. All economic costs include a competitive return -- that is, a reasonable level of profit. **[¶ 131]**

Another reason why regulators should rely on forward-looking economic cost estimates is that ILECs, like all competitors, will make decisions based on economic costs. That is, unless access rates are set at economic cost levels ILECs will recognize that the true marginal cost of access is much lower than the rates its competitors are paying. For competitors, the price charged by the ILEC will be an economic cost because it will represent an uncontrollable expense. This will provide ILECs with the incentive and ability to price their services to competing carriers anticompetitively and to reap the benefits of the true marginal cost access. Put differently, when an ILEC provides interexchange service, the ILEC's input cost of access would be the economic cost, not the price charged to competitors. 17/

17/ Historical or embedded costs sometimes may be useful in estimating economic costs. For example, incremental costs per unit might be approximated by comparing year over year embedded costs and demand. However, the use of ILEC embedded costs for any purpose should be minimized. The Commission's current accounting categories and ILEC accounting practices do not allow for useful tracking of interconnection and unbundled network element expenses. Indeed, several network functions that must be unbundled are based on technology that was not even considered during the last rewrite of the Uniform System of Accounts. Moreover, the accounting system and the jurisdictional separations process were

3. Shared Costs

If two or more services use the same piece of equipment, then the cost of the equipment is shared by all the services that use it. In this case, the economic cost of the individual services that use the shared equipment may not be precisely definable. The pricing rule in this situation is that the economic cost of the shared equipment must be recovered in the rates for all of the services that use it, but all of the prices of each individual service must be above the level of its individual costs.

Shared costs are not generally an issue for pricing interconnection and unbundled network elements. This is so because most costs are not shared across different network components, even if multiple services are ultimately provided by the element.

Consider, for example, the case of end office switching. Several services use the switching function. Therefore, switching might be thought of as a shared cost of several retail services. However, as an unbundled network element, switching can be sold as a complete unit of capacity. Therefore, the incremental cost of the switching function can be determined in a way that does not require allocation of shared costs among different services; rather, it is leased as a complete block of capacity to an entrant. When a telecommunications carrier purchases an unbundled switching element, it purchases it to provide all these services.

Admittedly, in those cases where there are shared costs that cannot be assigned to a cost cause or attributed to a particular service on the basis of usage, economic analysis is not always able to provide a useful a priori pricing rule. This does not mean economics is useless in pricing interconnection and unbundled network elements. For example, in the case of pricing unbundled network elements

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never designed to generate economic costs. Rates have been based as much on political considerations as on the economic considerations that govern implementation of the 1996 Act.

there may be some small level of shared costs that cannot be reasonably assigned to any interconnection or unbundled network element service. 18/ As a last resort, the economic shared costs that cannot be identified with particular services should be assigned to interconnection and unbundled rate elements through a clear and consistent Commission-imposed rule. Giving ILECs the discretion to distribute these costs to individual service provides them with the ability to make anticompetitive decisions. Assigning these unattributable costs in the same proportion as attributable costs is a reasonable solution.

4. Attributable Versus Non-Attributable Costs

The task of pricing regulated services requires the identification of the economic costs that should be recovered in the price of each service. The principle of cost-causation guides this process. If consumption of a service leads to cost, then the cost imposed should be recovered in the price of the service. As discussed above, historical or embedded costs are not atttributable. Costs incurred in the past are not affected by the decision today to consume interconnection or unbundled network elements. **[¶ 150]**

If shared costs are identified for a group of services, those costs are attributable to that group, but not necessarily to any individual service within the group. The pricing rules described above can be used by regulators to assign these costs to services. That is, where appropriate, costs should be recovered at the retail

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18/ In this case policy makers may legitimately decide to require that these costs be recovered from retail or final good services provided by the ILEC. The basis for this decision would be that recovering these costs from intermediate goods could distort competition at the final good level. Other mechanisms or decision rules for allocating these costs have been identified but are not useful here. For example, Ramsey prices would allocate otherwise unallocable shared costs to services based on demand elasticity. This rule could be overtly anticompetitive if the elastic services are precisely those that face the most potential competition. **[¶ 130]**

level to avoid competitive distortions. If necessary, unattributable costs should be assigned to interconnection and unbundled network elements on the basis of attributable costs. **[¶ 151]**

B. Alternative Cost Measurement Methodologies

Economic cost is defined as forward-looking cost. There are several ways to measure forward-looking cost. The place to begin is with the understanding that all forward-looking economic costs are *marginal* or *incremental* in nature. Marginal costs are those that result from a very small increase in output. Incremental costs are those that are incurred as the result of a discrete change in the output of a service. From the perspective of a firm, costs can be short run or long run. In the short run, fixed investments in capacity are not changed, while in the long run, the optimal level of capacity can be adjusted using best technology.

The optimal pricing of interconnection and unbundled network elements requires reliance on long run cost measurements. Short run costs are relevant to individual firm decision making. However, the Commission's objective is provide appropriate price signals for competitors and consumers. Therefore, the long run costs that form the basis of pricing in efficient markets should guide decision-making.

Thus, long run incremental cost (LRIC) is the appropriate cost standard. The increment of output to be measured is critical. Telephone company long run incremental cost studies have typically taken base output as given and measured the additional cost of some increment to demand. This type of LRIC study would not be appropriate for use in costing interconnection and unbundled network elements. The resulting prices would be too low If all units of output are priced at LRIC (assuming the increment is smaller than the total demand), there is

a risk that the resulting rates would not be compensatory in the sense that the total cost of providing all the units of output might not be recovered.

The proper incremental cost measure for pricing interconnection and unbundled network elements is Total Service Long Run Incremental Cost ("TSLRIC"). TSLRIC measures the entire cost to a firm of being in a separate line of business or providing an individual network component, divided by the entire quantity supplied. For example, if a hypothetical firm providing local switching and interoffice transmission decides to enter the loop business, the entire cost of adding loops to its array of services divided by the number of loops provided is the TSLRIC of loops. The TSLRIC of a single service firm is the total forward-looking cost of the entire firm. 19/

In summary, embedded costs would likely allow the firm to recover an inefficiently high level of revenues from its customers. Simple LRIC would not allow the firm to recover a sufficiently high level of revenues. Thus rates set at TSLRIC have the advantage of neither overcharging nor undercharging customers. Stated alternatively, TSLRIC is the appropriate costing standard because it is the cost a competitive firm would have to recover to stay in the business in the long run. **[¶ 126]**

Unless the firm is providing only one service, there will be economic costs to the firm of being in business that may not be associated with any single line of business. Pure overhead functions are an example. The TSLRIC of individual lines of business do not include these costs since they are common to all services

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19/ At least 12 states have required ILECs to conduct TSLRIC or LRIC cost studies for interconnection and/or unbundled network elements. See *Competition -- The State Experience*, Volume I, National Association of Regulatory Utility Commissioners Responses to FCC March 1, 1996, Questions. These states vary in how they then use the TSLRIC data to set rates.

and therefore are non-attributable. Similarly, there may be two or more lines of business that share some costs. The TSLRIC of each individual line of business will not include these shared costs. **[¶ 126]**

The extent of shared costs is an empirical question. As discussed above, and discussed further below, this is not a major issue for determining the costs of the interconnection and unbundled network elements that local and long distance competitors require.

C. Cost Models

The Hatfield Model, descriptions of which are being filed in the Comments of AT&T and MCI, provides regulators with a tool that can be used to establish TSLRIC costs for interconnection and unbundled network elements. The model estimates costs for the total loop as well as separate rates for loop distribution, concentration and feeder Separate costs are also estimated for end office switching (both port and usage), signaling, dedicated transport, common transport and tandem switching as well as operator systems and public telephones.

The original Hatfield Model, released in July, 1994, provided an estimate of the TSLRIC of providing Basic Universal Service. 20/ Basic universal service was defined to include single-line, single-party residential access to the first point of switching in a local exchange network, local usage within the exchange area, and access to emergency, operator service and directory assistance services. The original model provided a nationwide estimate based on the distribution of population within various density zones. Subsequent applications of the original model have measured the TSLRIC of basic universal service in individual states,

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20/ See Hatfield Associates, Inc., The Cost of Basic Universal Service, July, 1994.

measuring the cost of service within census block groups, telephone company exchange boundaries, or political subdivisions, such as counties.

The original model used a "green field" approach to constructing telephone networks within appropriate exchange areas. That is, the network is built up from scratch, ignoring existing telephone company switching locations and loop facilities. After publication of the original Hatfield model a group of carriers published the Benchmark Cost Model (BCM) 21/ The BCM provides useful data that can be used in conjunction with the Hatfield approach. The BCM uses a richer set of loop data and a simple switching model to estimate local service costs. However, the BCM takes existing ILEC switching nodes as given and therefore is not a true TSLRIC approach. 22/ The Hatfield model has, at the request of regulators, been run in some states using existing switching nodes.

At the request of MCI, the original Hatfield Model (henceforth "Hatfield I") has been extended to allow cost estimation of unbundled network elements. The March, 1996, Hatfield Report describes the results of that effort. 23/ The March, 1996, paper provides a nationwide estimate of costs by density zone. At the request of AT&T and MCI, the model is being further developed to allow application to individual states. The model described in AT&T's filing extends the BCM model to arrive at individual estimates based on a scorched node calculation.

21/ See MCI Communications, Inc., NYNEX Corporation, Sprint/United Management Co., and U S West, Inc., Benchmark Cost Model: A Joint Submission, CC Docket No. 80-286, December 1, 1995.

22/ Use of optimized node locations is more appropriate for the estimation of TSLRIC.

23/ See Hatfield Associates, Inc., The Cost of Basic Network Elements: Theory, Modeling and Policy Implications, March, 1996.

Versions of the model that allow estimates of unbundled network element costs will be referred to as "Hatfield II" 24/.

TSLRIC studies are often used to establish cost floors to ensure that prices are compensatory. The Hatfield II model results are being used to produce the actual rates for interconnection and unbundled network elements. The Hatfield results can be used for this purpose because, as discussed above, shared costs are not significant. The corollary to this result is that the Hatfield model does not take into account significant economies of scope among the various network elements whose costs are modeled. Finally, the Hatfield Model individual service costs contain an estimate for economic overhead functions. That is, the rates contain the costs for certain functions typically categorized as overhead (e.g., human resources), on the assumption that larger firms require larger expenses of this nature. As a consequence of all this, the Hatfield results may not differ substantially from stand alone costs.

In sum, the Hatfield Model, can be used by regulators as a default interconnection and unbundled network element price setting mechanism.

24/ The model has been under continuous development since it was originally produced. ILECs have criticized the Hatfield Model because certain assumptions have changed from proceeding to proceeding and over time. These changes are a function of two factors. First, there have been requests by model users to make individualized assumptions for various states. Second, since Hatfield I was released, improved assumptions have been made as the result of the acquisition of better information. The Hatfield modelers have consistently requested ILECs or any other party to provide better data where assumptions must necessarily be employed. The fact that ILECs have generally declined suggests that the results are conservatively high. Changes in the model are not a deficiency. In fact, they show that the model is a flexible tool for analysis.

D. Historical versus Economic Costs

If all ILEC rates were set at economic cost, their total revenues would be significantly less than they are today. This should not deter the Commission from using economic costs as the basis of rates, however. First, setting interconnection and unbundled network elements at cost will not lead to all prices falling to cost immediately. Competitors must make substantial investments over a period of years before they are able to take full advantage of cost-based rates for interconnection and unbundled network elements. This will provide ILECs with the opportunity to become more efficient. **[¶ 144]**

Second, the difference between economic costs of interconnection and unbundled network elements and embedded costs is not entirely due to inefficiencies. A substantial portion of the difference may represent economic costs of other services. For example, the Hatfield Model shows that embedded loop expenses are excessive when compared to the economic costs of providing unbundled loops. However, much of the difference may be explained by loop investment made to support Centrex services or fiber investment made in anticipation of entry into video services. Large investments in fiber capacity to support entry into the interLATA business may also be contained in the embedded expenses of the ILECs. Such investment was often made by RBOCs to build "official" interLATA networks. That investment was included in the rate base but now can be used to provide interLATA service. 25/ In sum, a portion of the excess investment represents the economic cost of other services.

ILECs would have the Commission set rates that allow full recovery of all of their expenses on the basis of historical costs. If the Commission were to

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25/ The BellSouth official interLATA toll fiber optic network in Florida, for example, has excess capacity of over 85 percent. Source: Southern Bell discovery response in Florida Public Service Commission Docket No. 92-0260.

commit to this view, the result would be directly contrary to the goals of the legislation. Competition is valued in large part because it will bring consumer rates down to the level of economic cost. If ILECs are guaranteed their existing level of revenues, the consumers benefits from competitive entry would be drastically reduced -- both directly and indirectly. The benefits would be directly reduced because prices would stay high as the uneconomic costs of the ILECs are placed in the cost structure of new entrants. The benefits would be indirectly reduced because the flexibility to strategically allocate uneconomic costs can be used to reduce or reduce competition in the first place.

E. Glossary of Terms

With this background, the following glossary of economic pricing and costing concepts is provided: **[¶ 126]**

Common Costs: Costs incurred by all of a firm's services.

Economic Cost: The cost that an efficient entrant into a competitive market would incur. This is also a forward looking cost.

Embedded Cost: Embedded costs are historical costs of investment and operations as recorded on the firm's accounting books.

Historical Cost: Historical costs are embedded costs.

Incremental Cost: The cost of providing additional services using modern, least-cost technology. *Total Service Long Run Incremental Cost* measures the cost per unit of the entire increment of demand.

Joint Costs: Costs shared by two or more services when the services are provided in fixed proportions.

Overhead Cost: Costs common to the firm as a whole or shared among services, each of which may vary with the scale of the firm

Shared Cost: Costs that are incurred by two or more services, but not common to all of the services of the firm.

Stand-Alone Costs: The cost of producing a service by itself -- that is, without the benefit of any economies of scope from providing additional services within the firm.

IV. THE FCC MUST ADOPT A BROAD VIEW OF NETWORK UNBUNDLING.

[Notice, Section II.B.2.c.]

A. The FCC Must Establish Principles to Guide Application and Enforcement of Section 251(c)(3) Unbundling Mandates.

It is critical that the FCC establish: (a) the *basic principles* embodied in the Act's network unbundling requirement and (b) define a *core initial list* of unbundled network elements that must be made available by all incumbent ILECs. In this section we identify and discuss the basic principles. In the following section, we identify the specific core unbundled elements that the FCC should require all ILECs to provide.

The FCC should adopt the following basic principles in applying and enforcing Section 251(c)(3)'s unbundling requirement:

1. ILECs must be responsive to the legitimate needs of competitors who request network unbundling.

2. ILECs must provide an unbundled element upon request unless the ILEC can demonstrate the technical infeasibility of providing that element.

3. The availability of such an element from another ILEC is prima facie evidence of its technical feasibility.

4. Unbundled elements may be used by any telecommunications carrier for any purpose, including the provision of interexchange access to itself or to other carriers.

5. ILECs must provide an unbundled switching element separate from transport and loop facilities.

6. Requesting carriers may combine any or all unbundled elements without limitation, and ILECs must provide such elements in a manner that permits such combination.

7. The unbundling obligation is not static; rather, it will evolve with time, experience, and technological change.

8. State commissions may expand on the minimum requirements set by the FCC.

9. The ILECs must provide automated, nondiscriminatory operational support mechanisms for each unbundled element.

We discuss each of these principles below.

1. ILECs must be responsive to the legitimate needs of competitors who request network unbundling. The FCC must make it clear that it is not up to the ILEC to decide whether to provide a particular unbundled network element. The Act's unbundling obligation is without limitation: ILECs must respond to the requesting carrier's need for access to unbundled network elements. As the FCC correctly observed in the Notice, the purpose of network unbundling is to enable other carriers to "purchase access to those elements incumbent LECs can provide most efficiently, and at the same time build their own facilities only where it would be efficient." 26/ Requesting carriers know where they want to build and where it is better to buy ILEC facilities. Incumbent LECs must be responsive to such carriers' assessments of their own needs, and unbundle the existing ILEC network in response to those needs wherever technically feasible.

26/ Notice, ¶ 75.

2. ILECs must provide an unbundled element upon request unless the ILEC can demonstrate the technical infeasibility of providing that element. The FCC correctly proposed to place the burden of proving infeasibility on the ILEC. Notice, ¶ 87. This is appropriate, since the ILEC is in control of the information that would be needed to prove feasibility. It is also consistent with the orientation of the Act, which is to assume responsiveness to the requests of other carriers. Finally, placing the burden on the ILEC is essential in order to prevent the ILECs from automatically raising technical infeasibility as a bar to provision of a requested element. **[¶ 87]**

3. The availability of such an element from another ILEC is prima facie evidence of its technical feasibility. For the same reasons, it is appropriate, as the FCC proposed, to rely on the provision by another ILEC of an unbundled element as evidence of its technical feasibility. Notice, ¶ 87. Such availability should be considered prima facie evidence of feasibility. **[¶ 87]**

4. Unbundled elements may be used by any telecommunications carrier for any purpose, including the provision of interexchange access to itself or to other carriers. Nothing in the Act restricts the ability of requesting telecommunications carriers to use unbundled elements. Section 251(c)(3) provides that unbundled elements, alone or in combination, may be used to provide "a telecommunications service," without restriction. The FCC is correct in its tentative conclusion that when a carrier uses unbundled elements it does not have to pay Part 69 access charges in connection with its use of those elements for interexchange access. Notice, ¶ 165. As the Commission recognized, unbundled network elements do not have a jurisdictional character; they are just facilities leased by another carrier for use for any purpose. Once those facilities are employed by a requesting carrier, and that carrier pays the full cost of those facilities (as provided in Section 252(d)(1)), then the carrier chooses how to use

those facilities. This principle applies regardless of whether the carrier purchases unbundled elements separately or combines them in a platform configuration. 27/ In either case, the carrier may provide any or all of the services provided (and self-provisioned) by the ILEC itself over such facilities. **[¶¶ 90, 165]**

5. ILECs must provide an unbundled switching element separate from transport and loop facilities. The network unbundling obligation clearly encompasses an obligation to offer local switching unbundled from transport, loops, and other service. The FCC should adopt its tentative conclusion that ILECs must provide an unbundled switching element. 28/ The Commission correctly looked to the Illinois staff for its precedential analysis concerning unbundled switching, known in that jurisdiction as a "local switching platform," for guidance. 29/ The unbundled local switching element, as the Commission should define it, would give a competing carrier access to all the capabilities of the ILEC's local switch, on a capacity basis, without reference to the retail services associated with that switch. 30/ It should be unbundled from transport and the loop -- as required by Section 271(c)(2)(B)(iv)-(vi), as well as by Section 251(c)(3). The switching element should have access to all switch capabilities, whether or not actually being used by ILECs to provide their own current retail offerings. 31/ An unbundled port, as

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27/ See discussion of the unbundled "local switching platform" in the Notice, ¶ 100.

28/ Notice, ¶ 98.

29/ Notice, ¶ 100.

30/ We set forth a more detailed definition of unbundled local switching in the next section, which contains a list of core unbundled elements.

31/ One competitive benefit of switch unbundling is that competitors may devise services based on existing LEC switch capabilities that the LEC is not currently providing.

described in the Notice, clearly would be inadequate to meet the preceding definition. 32/ **[¶¶ 98-103]**

The price of the unbundled switching element should generally reflect the manner in which the switching costs are incurred, without being unduly complex. 33/ Line-specific switching costs should be recovered through a flat rate. Costs attributed to calling volumes should be recovered through a usage-sensitive rate. 34/ There should be no additional charges for vertical features provided by the switch (CLASS or custom calling features) as the cost of providing those features is already reflected in the charge for the contracted switch capacity. **[¶¶ 100, 153]**

The availability of unbundled local switching is essential if local competition is to develop on a widespread, mass market basis. (See Section I, above.) Reliance on an unbundled loop model alone (one that requires installation of a competitor's own local switch) is useful only to serve customers clustered near dense central offices. As the FCC noted in the Notice, AT&T estimates "that it would have to invest approximately $29 billion to construct new facilities in local markets in order to provide full facilities to reach 20 percent of the 117 million access lines served by the BOCs." 35/ Substituting ILEC unbundled loops phases in

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32/ Notice, ¶ 101.

33/ When the FCC referred to a sharing of the risk that is associated with the purchase of switching capacity as an unbundled element, it appeared to be referring to the need for the purchaser to make a commitment to a certain level of switching capacity for a certain term. Notice, ¶¶ 100, 153. The Act's focus is on cost. Carriers should be free to purchase switch capacity on a per-line or multiple-line basis, and on term bases, but the rates for such options should be based on actual ILEC cost.

34/ The volume-specific costs may not be sufficient to justify a separate charge.

35/ Notice, ¶ 7 n.15.

only about half of that construction cost. That is so because a new entrant using ILEC unbundled loops still must duplicate the ILEC local switching and interoffice infrastructure. There are approximately 18,000 local switches nationwide. AT&T, the largest interexchange carrier, has only 134 toll switches nationwide, by comparison.

The Commission therefore must adopt its proposal to require switch unbundling in order to lay the groundwork for widespread competition with ILECs. With RBOC entry, such widespread entry capability will be essential if consumers are to be able to choose from more than one full-service provider.

6. Requesting carriers may combine any or all unbundled elements without limitation, and ILECs must provide such elements in a manner that permits such combination. The plain language of Section 251(c)(3) requires ILECs to "provide such unbundled network elements in a manner that allows requesting carriers to combine such elements in order to provide such telecommunications service." This language could not be more straightforward. Yet some ILECs have attempted to block the ability of other carriers to make full use of the incumbent ILEC network by arguing that the Act somehow requires requesting carriers to own local facilities in order to combine network elements.

Obviously, such a requirement is nowhere to be found in the Act. The Commission should make it clear that ILECs cannot impose -- as a prerequisite to purchase of unbundled elements -- a requirement that the requesting carrier own local facilities. Such a prerequisite would have the practical effect of dramatically reducing the number of carriers that could lease ILEC unbundled network facilities, and would restrict full service competition to those locations where construction of local facilities is economically justified and has actually occurred.

Unbundled local switching can be combined with other unbundled elements in a network platform that can permit competing carriers to offer services

without first needing to own local facilities. They can design their own retail services, pricing packages, and calling areas by relying upon access to switch capacity and functionality. Because they are paying the cost of the underlying network facilities, these competitors are free to experiment in the recovery of those costs in the prices of retail services. They are not tied, as they would be by service resale, to the incumbent LEC's decisions about how to recover those costs. Employing unbundled network elements in a platform configuration under Section 251(c)(3) therefore is entirely different from resale of ILEC retail offerings under Section 251(c)(4). 36/

A reading of the Act that permits carriers to combine unbundled elements as a platform will promote, not impede the construction of new local networks. Over time, the unbundling requirements, including the combination requirement, should lead to more, not less, local facilities construction, as carriers build their customer bases and revenues and begin to substitute their own facilities (or those provided by other carriers) for those of the ILEC.

No local competition will take place, however, if the ability of providers to enter the market at all is stymied. As the FCC recognized in the Notice, Congress did not prejudge what local facilities investment would take place or how fast: "Viewed as a whole, the statutory scheme of section 251(b)and (c) enables entrants to use interconnection, unbundled elements, and/or resale in the manner that the entrant determines will advance its entry strategy most effectively." Notice, ¶ 15. Congress created a number of options that would permit the marketplace to determine where investment is efficient.

36/ In addition to these limitations of the service resale model, ILECs also can make it difficult at best to provide competitive local service via resale of retail offerings, as we discuss below in connection with Section 251(c)(4) resale. See Section V, infra.

7. The unbundling obligation is not static; rather, it will evolve with time, experience, and technological change. The initial core list of unbundled network elements that the FCC will adopt in August is obviously critical to the success of the first stages of local competition. But it is also essential that the FCC and the states view this process as evolutionary. As competing carriers gain experience with using unbundled elements, and as they begin to build their own local network facilities, they doubtless will identify additions or modifications to the core list. As ILEC network capabilities evolve, moreover, the unbundling obligation must also evolve. The Commission must make this clear in its August order, or the ILECs will point to those rules as both the beginning and the end of their obligations under the Act.

8. State commissions may expand on the minimum requirements set by the FCC. A corollary to the previous principle is that state commissions also should be able to expand upon and develop the core unbundling requirements enunciated by the FCC. State commissions have and will continue to acquire valuable experience with the development of local competition and with the technical and operational issues that accompany unbundling. States must be free to use that experience to make local competition work well. The FCC must make this important state role clear.

9. The ILEC must provide automated, nondiscriminatory operational support mechanisms for each unbundled element and combinations. The FCC must make it clear that a part of the Section 251 obligation to provide access to unbundled network elements is the obligation to develop automated, nondiscriminatory operational support mechanisms to enable competing carriers to employ unbundled elements to provide service on a basis that is comparable to the

manner in which the ILEC provides service over those elements. We discuss this in depth in Section VIII, below. 37/

B. The FCC Should Adopt A Minimum Set of Unbundled Elements Subject to Amplification by States and Expansion Over Time.

[Notice, Section II.B.2.(3); ¶¶ 92-116]

The statute includes a broad definition of what constitutes a network element:

> "A facility or equipment used in the provision of a telecommunications service [including] features, functions, and capabilities that are provided by means of such facility or equipment, including subscriber numbers, databases, signaling systems, and information sufficient for billing and collection or used in transmission, routing, or other provision of a telecommunications service."

47 U.S.C. § 153(a)(45).

Network elements can be individual pieces of equipment, specific facilities, or functions performed by equipment and facilities. Network elements will be obtained by carriers individually, as well in established combinations to perform routine functions. For instance, the functionality performed by the local switch and loop (themselves network elements) will frequently be purchased together for call termination, a function that itself is a network element.

The TCC has identified the following as a base list of network elements to which nondiscriminatory access is needed for carriers to be able to provide telecommunications services under Section 251(c)(3). 38/ It is technically feasible

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37/ Automated interfaces are equally important for resale under Section 251(c)(4), as we discuss below in Section VIII.

38/ While AT&T has advocated a minimum set of 11 unbundled network elements, the proposed elements identified here by the TCC are entirely consistent

for incumbent LECs to provide access to each of these elements and to interconnect with competing carriers to order to provide each element.

Network Interface (NI) Device: a termination device that establishes the network demarcation point. The NI for residential customers typically resides outside the customer premises and features two independent chambers that separate the public network termination from the consumer's inside wiring. The NI for a business and for a multiple tenant customer is often located in an equipment area or closet within a building and uses termination blocks to interconnect the public network and inside wiring. The NI provides a protective ground connection and is capable of terminating fiber, coax or twisted pair cable.

Loop Distribution: the portion of the outside plant cable from the network interface at the customer's premises to the terminal block appearance on the distribution side of a feeder distribution interface (FDI). In cases where a distribution closure is near the customer's premises, loop distribution consists of the drop between the distribution closure and the customer's NI and the twisted pair from the closure, in which case distribution terminates at the concentrator/multiplexer. Typically, loop distribution is copper twisted pair, but it can also be coax, fiber, wireless, or a combination of these.

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with those independently advocated by AT&T. AT&T views data switching, digital cross-connect systems, and local operator services/local directory assistance as necessary requirements for unbundling and considers these elements as subtending the unbundled elements of local switching, dedicated transport and operator system, respectively. AT&T also supports competitive access to AIN capabilities via non-discriminatory provisioning of unbundled signaling elements. Finally, although AT&T has not independently proposed that the Commission identify the Network Interface (NI) as an unbundled element, AT&T recognizes that various parties have a legitimate competitive need for unbundled access to end user's inside wire.

Loop Concentrator/Multiplexer: the digital loop carrier (DLC) equipment, channel bank, or similar equipment at which individual subscriber traffic is multiplexed/demultiplexed and/or concentrated/unconcentrated. On the customer end, derived pairs from the loop concentrator/multiplexer are typically terminated on the feeder side of the FDI distribution closure, or on the NI when the equipment is located at or within the customer's premises.

Loop Feeder: the medium on which subscriber traffic (multiplexed/concentrated or non-multiplexed/non-concentrated) is carried from the Main Distribution Frame (MDF) or Digital Cross-connect (DSX) panel in a central office or similar environment (e.g., closets in cases of remote sites) to the loop concentrator/multiplexer (typically located at or near the feeder distribution interface), or the feeder distribution interface in the case of direct twisted pair loops. The medium of the feeder can be copper, coax, fiber, wireless or a combination of these.

Local Switching: an element that provides the functionality required to connect the appropriate originating lines or trunks terminated on the MDF or DSX panel to a desired terminating line or trunk. This functionality includes, but may not be limited to: signaling, signaling software, digit reception, dialed number translations, routing and recording, call supervision, dial tone, switching, telephone numbers, announcements, calling features, and capabilities (including call processing), Centrex, Carrier Pre-subscription (e.g. LD carrier, intraLATA toll), CIC code portability capabilities, testing and other operational features inherent to the switch and switch software. It also provides access to transport, signaling (ISUP and TCAP), and platforms such as adjuncts, Public Safety Systems (911), operator services, directory services and Advanced Intelligent Network as determined by the Interconnecting Carrier. Remote Switch Module functionality is included in the switch function. The switch elements used will be based on the line

side features they support. The switch will also be capable of routing traffic to ILEC owned network elements as well as non-ILEC owned elements

Local Operator Services: those systems that provide for processing and recording of special call types that include toll calls, public telephone call types, as well as other call types requiring operator intervention/assistance. Operator assistance call types would include BLV/EI (busy line verification/emergency interrupt), or provide and intercept functionality to those call types where the caller dials a number that has been changed or disconnected.

Local Directory Assistance: the function for storing customer specific data and then providing assistance functions in obtaining customer listing data.

Common Transport: an interoffice transmission path (including the equipment and facilities) shared with the ILEC and/or other carriers (typically used for switch to switch transport within the ILEC's network). Common transport is used within the ILEC's network (not between networks). It includes: multiplexing functionality; grooming functionality (other than that provided by a Digital Cross-Connect System (DCS); redundant equipment and facilities necessary to support protection and restoration; and cross-office wiring to a DSX or LGX where facilities from a switch, cross-connect, or other service platform are terminated.

Dedicated Transport: an interoffice transmission path (including the equipment and facilities) dedicated to a single carrier. This may include, but is not limited to: multiplexing functionality; grooming functionality (other than that provided by a DCS); redundant equipment and facilities necessary to support protection and restoration; and cross-office wiring to a DSX or LGX where facilities from a switch, cross-connect, or other service platform are terminated.

Digital Cross-Connect System: an element that provides automated cross-connection, facility grooming, bridging, point to multipoint connections, broadcast and automated facility test capabilities. The element may also provide

multiplexing, format conversion, signaling conversion, etc. Cross-office wiring to a DSX or LGX where facilities from a switch, another cross-connect, or other service platform are terminated are included as a part of this element. In cases where automated cross connection capability does not exist, a "cross connect system" will be defined as the combination of DSX path panels and D4 channel banks or other DSO and above multiplexing equipment used to provision the function of a manual cross connection.

Data Switching Element: an element that provides data services (e.g., packet transport, frame relay or ATM) switching functionality that is required to connect the facilities from the User to Network Interface (UNI) to either another UNI or to a communications path at the Network to Network Interface (NNI).

SS7 Message Transfer and Connection Control: an element that enables the exchange of Signaling System 7 (SS7) messages among switching elements and database elements. It includes all functions of the Message Transfer Part (MTP), Signaling Connection Control Part (SCCP), and the Operations, Maintenance and Administration Part (OMAP) of SS7 commonly performed by Signaling Transfer Points (STPs). This element is sometimes referred to as the STP, but also includes the transport of SS7 messages over signaling links connecting switching elements to STPs, database elements to STPs, and STPs to STPs.

Signaling Link Transport: a set of two or four dedicated 56kbps transmission paths among the interconnecting carrier-designated Points of Interconnection (POIs), satisfying an appropriate requirement for physical diversity.

SCPs/Databases: a node in the signaling network to which informational requests for service handling, such as routing, are directed and processed in real time. Examples of databases include (but are not limited to)

emergency services databases, toll free number portability databases, and local number portability databases.

Tandem Switching: the establishment of a temporary communications path between two switching offices through a third (the tandem) switch. Typically, the tandem switch is used to connect end offices, other tandems, or to provide connection to IXC, independent telephone company and competing carrier switches. The tandem switch may also be used to provide SSP capabilities when these capabilities are not available in the EO.

Advanced Intelligent Network (AIN): a network architecture that is designed to provide a means for carriers to offer advanced features and services independent of the local switch vendor. Specification of particular points in the call model (i.e., triggers) at which the end office suspends call processing and launches an SS7 TCAP query to a database allows for application logic to be separated from the switching platform in a standard manner across all switch types that are AIN capable.

V. ILECS MUST PERMIT RESALE OF ALL ILEC RETAIL OFFERINGS AT RATES EXCLUSIVE OF RETAIL-RELATED COSTS.

[Notice, Section II.B.3.; ¶¶ 172-178]

A. Service Resale Will Be an Important Option for Many Carriers.

Congress provided another option for provision of competing local service: resale of ILEC retail offerings. This option has the potential to be a relatively straightforward entry mechanism that would permit competitors to buy off-the-shelf ILEC retail offerings and combine them with their own services to form full-service packages in competition with the ILEC. Resellers could rely upon their own billing, customer service, and marketing efforts to provide resold local services to their customers.

Unlike the unbundled network platform option, through service resale a new entrant need not design its own service, pricing, and calling areas. It also need not decide how to configure the network elements or set up mechanisms for billing interexchange carriers for access. Thus, service resale is an important competitive option. The FCC must take care to adopt rules that will give effect to the Congressional intent that resale be a viable means of competitive local market entry.

We must emphasize the word "potential" here, however. Service resale has been tested on a significant basis in only one ILEC service area: Rochester Telephone Company. Although that company has permitted resale at a point at which other ILECs refused to consider the possibility, it remains the case that imposed operational difficulties and the small wholesale differential (five percent off retail) have made the Rochester resale opportunity up to now largely nonviable as a practical commercial matter. 39/

The FCC and state commissions must ensure that the ILECs comply with their clear statutory obligation to make all their services available for resale (with one limited exception), and that they do so at correctly calculated wholesale rates. As is the case with network unbundling, it is critical that the FCC establish uniform national guidelines for application and enforcement of Section 251(c)(4). **[¶ 177]**

It also is critical that the FCC require ILECs, as part of their Section 251(c)(4) obligation, to establish automated, nondiscriminatory operational support mechanisms for the ordering, installation, maintenance, repair and billing of

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39/ We discuss AT&T's experience with service resale in Rochester in Section VIII, below.